NOR ENVIRONMENTAL LTD COLPRO, SYSTEM AND SUB SYSTEM INTEGRATION

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This presentation will touch on the following areas, Nor E COLPRO, system and sub system integration, CBR/NBC resistant materials, filter systems, power generation, air conditioning and heating system, decontamination integration and operations for medical and non medical COLPRO in a Chemical, Biological Radiological (CBR) environment under military operations as well as in the HOT Zone operations of Weapons of Mass Destruction (WMD) scenarios in a civilian response operation.

All Nor Environmental Ltd. systems incorporate the following critical criteria; simplicity (minimal transitional training), redundant systems and generic replacement subsystems and techniques, straight forward, multifaceted operations in the maximum spectrum of environments.

The Nor E COLPRO for NBC operations incorporated the following systems and sub systems listed and described by criticality to operations.

NATO spec (AG-12) materials for both outer cover and inner liner. We are very pleased with our material selection of material manufacturer (Fabrine PGI). The Nor E philosophy takes into account the worst case scenario, where a command post or medical COLPRO for what ever reason comes under direct chemical attack either via direct bombardment or air attack, the system must be capable of withstanding direct liquid chemical contamination for at least the minimum NATO standard of 24 hours without liquid penetration, to this end our systems are designed with a chemical resistant outer covers for protection from direct contact and contamination. These outer covers are fully decontaminable, reusable, UV protective, and fire retardant.

Our inner liner is again fully decontaminable, reusable, chemical resistant to NATO standards, and fire retardant. We maximize the use of leak techniques to counteract dead air pockets and potential vapor build up in those areas. Our systems are designed to in house standards that dictate redundancy, this has driven our door design, seam manipulation and repair kit selection. With our in-house operations testing we have ruptured seams and panel areas large enough for a person to walk through and have been able to repair the ruptures without over pressure dropping to relative 0. This capability would eliminate the requirement for mass evacuation and complete compromise of the COLPRO system. Other tests carried out include catastrophic failure of power generating system and filtration system. Our in-house testing has demonstrated that our inner liner design allows us in excess of 8 minutes from system failure before relative 0 overpressure occurs. In A hospital / Aid station scenario it would give time for litter casualties to be masked and or put into filtered casualty bags.

The standard Nor E filter system is designed to be light weight, field durable with the capability of having all filters elements changed with out shutting down the filter system. Our standard filter system runs at 600 cfm maximum air flow, is quiet run, and utilizes M 48 A1 filter elements, the is primarily due to element size and weight. These filter elements are small enough for complete system element replacement by the fifth percentile member in less than 10 minutes. Our capability to change on the fly gives the Nor Environmental systems a marked advantage over systems requiring two filter systems or those that must shut down thus loosing overpressure to change filters elements, as well, any single

member of the team can change our elements when required. However the Nor E COLPRO can incorporate any field filter system in service today. Additional filter systems are added when multiple TFA's are incorporated into the core COLPRO system and over pressure is adjusted through out the complex to ensure air flow criteria.

Nor Environmental incorporates full Contamination Control Area (CCA) operations into all of our COLPRO systems to include Shower Decontamination Areas if required. The CCA incorporates staged areas with overpressured airflow vectored from the Toxic Free (TFA) through the airlock area and out the CCA so that any vapor hazard is purged into the rough decontamination area outside the COLPRO entrance. The CCA and airlock doors are designed to be redundant with the ability to be replaced on the fly and not compromise overpressured operations, these doors are designed to operate with zipper failures. Our CCA is designed for worst case scenario, where even in a non-medical COLPRO there must be the ability to bring a litter casualty and stretcher bearers through the full decontamination process. Nor Environmental strives to make all of our systems multi functional and multi task capable.

We have incorporated extremely quiet run generator kits into all of its systems, with the option of battery backup incase of catastrophic failure. With our latest systems we have incorporated hydrogen power cell generation where weight is not limiting factor, this minimizes system heat signature. Power generation must be capable of maintaining, filtration, electrical requirements, AC/Heating and not become a physiological impediment to personnel inside the COLPRO because of the noise level over a long period of time.

Our air conditioning and heating systems are considered augmentation systems. We have taken the approach that AC/ Heating however required by operational and geographical environment must not be capable of jeopardizing or compromising the filtration and over pressure requirements of the complete system. Our AC/ Heating systems are NBC vapor and liquid agent hardened to protect against vapor creep and pressure draw. They are fully decontaminable; all mechanical parts are liquid agent protected

CCA Operations

STAGE 1: We incorporate a Rough Decontamination Area under chemical cover where auxiliary equipment is removed and national standards for personal decontamination are carried out by the individuals with direction form decontamination staff, this includes decontamination of the NBC mask.

STAGE 2: Personnel then steps into the second stage of the CCA which is over pressured but still considered in the HOT zone (Liquid Hazard Area, LHA). Here Individual Protective Equipment (IPE) is removed (other than the NBC mask) with assistance, from the decon staff and carefully transitioned to stage 3

STAGE 3: This stage is considered a VAPOR HAZARD AREA (VHA), the personnel are still masked, they are monitored for contamination on their under garments and skin, if none are present they are moved forward to the air lock. If they are contaminated the person is moved forward to the shower area, where they completely undress and shower with either soap and water or bleach solution (National Standard) with NBC mask on. They are then given temporary garments, re-monitored if clean they are moved forward to the airlock, if still contaminated they re-shower until clean.

STAGE 4: Clean personnel move to the airlock, open the first door and walk in; multiple personnel can enter the airlock at the same time. Once inside the airlock the CCA side door is closed NBC masks are removed and the Toxic Free Area (TFA) door is opened, the personnel enter the TFA, the airlock door is then closed. Personnel are re-equipped with IPE in the TFA.

This same process can be carried out on a chemical casualty on a litter, the casualty must be transferred to a clean litter once outer IPE has been removed.

In Nor Environmental Medical COLPRO the same process is utilized with separate CCA's for Litter casualties and walking wounded and other personnel. In those units we use fully decontaminable roller systems that transition the litter casualty form rough decontamination through IPE removal to shower decontamination and through air lock through to the TFA and full medical assistance, which dramatically cuts down staffing requirements,

CONCLUSIONS

The Nor Environmental Ltd. family of systems minimizes Decontamination Staff, and simplifies transition from CCA to TFA. This simplification reduces staff and timeframes enhancing the overall effectiveness and through-put of COLPRO operations for both medical and non medical decontamination and operations. This in turn allows lower team staffing levels, reduced time prior to medical triage and care, as well minimizing casualty exposure to hazards.

Thus the Nor E family of systems and the Nor E concept of operations in a contaminated environment utilizing COLPRO as a medical / aid facility, rest shelter, or command post ensure operations in a contaminated zone are more efficient and effective in seamlessly turning troops and casualties around.